LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1.   (Previously Presented) A method for providing a multicast of a packet, which is included in a transport stream, in a digital network, the method comprising:

receiving at an input port of a multimodulator the transport stream having a plurality of packets included therein;

determining from a table whether a given packet of the plurality of packets is a multicast packet or a unicast packet, wherein a multicast packet is designated for transmission from a plurality of modulators included in the multimodulator and a unicast packet is designated for transmission from only one modulator of the plurality of modulators, wherein each modulator of the multimodulator includes an identifier;

appending a data unit header to each packet, the data unit header including the modulator identifier identifying one or more of the plurality of modulators from which the packet is to be transmitted;

providing each packet to one of a multicast or unicast buffer in accordance with the data unit header, a respective unicast buffer being associated with each of the plurality of modulators of the multimodulator;

when a particular modulator is available for transmitting, determining whether to retrieve a packet from an associated multicast or unicast buffer, each packet retrieved from the multicast buffer being copied depending on how many of the plurality of modulators from which the multicast packet is to be transmitted based on the data unit header;

stripping the data unit header from each packet prior to transmission from the particular modulator; and

modulating and transmitting each packet and copied packet from one of the plurality of modulators;

wherein at least some of the appending, providing, determining and stripping is performed by the multimodulator.

2.   (Canceled)

3.   (Canceled)

4.   (Previously Presented) The method of claim 1, further comprising processing each packet prior to transmission from one or more of the plurality of modulators, wherein the step of processing includes encrypting the given packet.

5.   (Canceled)

6.   (Canceled)

7.   (Previously Presented) The method of claim 1, further including the steps of:
        receiving a message indicating that an output buffer associated with the particular modulator of the plurality of modulators is ready to receive a packet for transmission therefrom; and

        sending a packet from one of the multicast buffer or the unicast buffer to the output buffer associated with the particular modulator, wherein the data unit header associated with the sent packet identifies the particular modulator.

8.   (Previously Presented) The method of claim 7, wherein each unicast buffer is adapted to store unicast packets that are for transmission from the given modulator associated with the unicast buffer, and the multicast buffer for storing multicast packets therein intended for transmission from two or more of the modulators.

9.   (Previously Presented) The method of claim 8, prior to the step of sending, further including the step of:

determining whether to check the unicast buffer associated with the particular modulator for a unicast packet for transmission from the particular modulator or to check the multicast buffer for a multicast packet;

responsive to determining to check the associated unicast buffer, retrieving from the associated unicast buffer the given packet when there is a unicast packet stored therein; and

responsive to determining to check the multicast buffer, determining whether a packet stored in the multicast buffer is for transmission from the particular modulator and retrieving the given packet from the multicast buffer when the given packet is determined to be for transmission from the particular modulator.

10.   (Original) The method of claim 9, prior to the step of sending, further including the step of:

associating a count register of a plurality of count registers with each modulator of the plurality of modulators;

incrementing the count register associated with the particular modulator indicated by the message; and

when a packet is retrieved, decrementing each count register associated with a modulator identified by the modulator identifier associated with the retrieved given packet.

11.   (Original) The method of claim 10, wherein each unicast buffer is a first-in-first-out buffer, and when the given packet is retrieved from the given unicast buffer the given packet is the current first-in packet, and wherein when the given packet is retrieved from the multicast buffer the given packet is determined at least in part by the current status of the plurality of count registers and at least in part by the modulator identifier associated with the given packet.

12.   (Original) The method of claim 9, wherein the determination for checking the multicast buffer or the associated unicast buffer is based at least in part on the current status of the multicast buffer and the associated unicast buffer.

13.   (Original) The method of claim 9, wherein the determination for checking the multicast buffer or the associated unicast buffer is based at least in part on prior determinations.

14.   (Original) The method of claim 1, wherein at least one modulator of the plurality of modulators is a radio frequency modulator.

15.   (Original) The method of claim 14, wherein the radio frequency modulator is a quadrature amplitude modulation modulator.

16.   (Previously Presented) The method of claim 1, wherein the packets of the transport stream include packets conforming to MPEG protocols, and, depending upon a management field in the data unit header, the given packet has a first PID when it is received and a second PID when it is transmitted, wherein the second PID is different from the first PID, wherein the management field includes information regarding PID remapping of the first PID to the second PID.

17.   (Original) The method of claim 1, further including the steps of:
      receiving a second transport stream at a second input port, the second transport stream including a plurality of packets;
      extracting from the first and second transport streams each packet that is to be transmitted from at least one modulator of the plurality of modulators; and
      sorting extracted packets into a plurality of groups; the plurality of groups including a multicast group that includes multicast packets from the first and second transport streams and at least one unicast group that includes unicast packets from the first and second transport streams.

18.   (Canceled)

19.   (Previously Presented) The method of claim 17, wherein the at least one unicast group is a plurality of unicast groups, each unicast group is associated with a given modulator of the plurality of modulators, and wherein the data unit header identifies the given modulator of the plurality of modulators from which the unicast group is transmitted.

20.   (Original) The method of claim 19, wherein the first and second transport streams include packets that conform to MPEG protocols.

21.   (Original) The method of claim 20, wherein at least one packet of the first transport stream has a first PID value associated therewith and at least one packet of the second transport stream has a second PID value associated therewith, and wherein the first PID value and the second PID value are the same value.

22.   (Original) The method of claim 19, wherein when a packet conforming to MPEG protocols is received the packet has a first PID value associated therewith, and the packet has a second PID value associated therewith when the packet is transmitted and when the packet is a multicast packet.

23.   (Previously Presented) A plurality of multimodulators in a digital network that receive at least one transport stream, each of the plurality of multimodulators transmit all or a portion of the at least one transport stream, each of the plurality of multimodulators comprising:

an input port adapted to receive the at least one transport stream, each transport stream having a plurality of packets included therein;

a processor in communication with the input port, the processor adapted to determine which packets of the at least one transport stream are multicast and unicast packets, wherein a multicast packet is a packet that is transmitted from a plurality of modulators, and a unicast packet is transmitted from only one of the plurality of modulators, the processor for appending a data unit header to each packet, wherein the data unit header associates each packet to at least one modulator for transmission;

a plurality of unicast buffers for storing unicast packets and a multicast buffer for storing multicast packets, each unicast buffer being associated with a respective modulator, each buffer for receiving a packet according to the data unit header thereof; and

the plurality of modulators in communication with the processor, each modulator adapted to request a buffered packet, modulate and transmit the requested packet therefrom, each multicast packet being copied from the multicast buffer for transmission depending on the number of transmitting modulators identified in the data unit header thereof.

24.   (Canceled)

25.   (Canceled)

26.   (Previously Presented) The plurality of multimodulators of claim 23, wherein the processor of each of the plurality of multimodulators processes a particular packet for transmission by encrypting the particular packet.

27.   (Canceled)

28.   (Canceled)

29.   (Previously Presented) The plurality of multimodulators of claim 23, wherein the processor of each of the plurality of multimodulators receives a request indicating that a particular modulator of the plurality of modulators is ready to receive a packet for transmission therefrom, and responsive thereto, the processor sends a given packet from a given buffer of the plurality of buffers to the particular modulator, wherein the data unit header associated with the given packet identifies the particular modulator.

30.   (Canceled)

31.   (Canceled)

32.   (Previously Presented) The plurality of multimodulators of claim 23, wherein the processor of each of the plurality of multimodulators is further adapted to keep count of packet requests from each modulator, and the processor decreases the packet request count for the particular modulator when a packet is sent to the particular modulator.

33.   (Previously Presented) The plurality of multimodulators of claim 32, wherein each unicast buffer is a first-in-first-out buffer, and when a given packet is retrieved from the unicast buffer associated with the particular modulator the given packet is the current first-in packet, and wherein when a given packet is retrieved from the multicast buffer the given packet is determined at least in part by the current status of the plurality of count registers and at least in part by the modulator identifier associated with the given packet.

34.   (Previously Presented) The plurality of multimodulators of claim 23, wherein a determination for checking the multicast buffer or the associated unicast buffer is made based at least in part on the current status of the multicast buffer and the associated unicast buffer.

35.   (Previously Presented) The plurality of multimodulators of claim 23, wherein the determination for checking the multicast buffer or the associated unicast buffer is based at least in part on prior determinations.

36.   (Previously Presented) The plurality of multimodulators of claim 23, wherein at least one modulator of the plurality of modulators is a radio frequency modulator.

37.   (Previously Presented) The plurality of multimodulators of claim 36, wherein the radio frequency modulator is a quadrature amplitude modulation modulator.

38.   (Previously Presented) The plurality of multimodulators of claim 23, wherein the packets of the at least one transport stream include packets conforming to MPEG protocols, and, depending upon a management field of the data unit header, the given packet has a first PID when it is received and a second PID when it is transmitted, wherein the second PID is different from the first PID, wherein the management field includes information regarding PID remapping specifying the first PID to the second PID.

39.   (Previously Presented) The plurality of multimodulators of claim 23, each of the plurality of modulators further including:
        a second input port in communication with the processor and the plurality of modulators, the second input port adapted to receive a second transport stream at a second input port, the second transport stream including a plurality of packets; and
        wherein the processor is further adapted to extract from the first and second transport streams each packet that is to be transmitted from at least one modulator of the plurality of modulators, and the processor is adapted to sort the extracted packets into a plurality of groups, the plurality of groups including a multicast group that includes multicast packets from the first and second transport streams and at least one unicast group that includes unicast packets from the first and second transport streams.

40.   (Canceled)

41. (Previously Presented) The plurality of multimodulators of claim 39, wherein the at least one unicast group is a plurality of unicast groups, each unicast group is associated with a given modulator of the plurality of modulators.

42. (Previously Presented) The plurality of multimodulators of claim 41, wherein the first and second transport streams include packets that conform to MPEG protocols.

43. (Previously Presented) The plurality of multimodulators of claim 42, wherein at least one packet of the first transport stream has a first PID value associated therewith and at least one packet of the second transport stream has a second PID value associated therewith, and wherein the first PID value and the second PID value are the same value.

44. (Previously Presented) The plurality of multimodulators of claim 41, wherein when a packet conforming to MPEG protocols is received the packet has a first PID value associated therewith, and the packet has a second PID value associated therewith when the packet is transmitted and when the packet is a multicast packet.

45 - 55. (Canceled)

56. (Previously Presented) The method of claim 1, wherein the multimodulator further comprises an output buffer associated with each of the plurality of modulators, the method further comprising storing each of the copied multicast packets into a respective one of the output buffers according to which of the plurality of modulators are identified in the data unit header.

57. (Previously Presented) The method of claim 1, further comprising processing each packet prior to transmission from one or more of the specified plurality of modulators, the data unit header being stripped after the processing.

58.   (Previously Presented) The method of claim 57, wherein the processing further comprises encrypting a payload of the data packet based on information in the data unit header.

59.   (Previously Presented) A multimodulator in a broadband delivery system of digital network that receives at least one transport stream, the multimodulator comprising:

an input port adapted to receive the at least one transport stream, each transport stream having a plurality of data packets included therein;

a packet handler that appends a data unit header to each data packet that has been determined is to be retransmitted from the multimodulator to provide a data unit packet, the data unit header including information identifying one or more of the plurality of modulators from which the packet is to be transmitted;

memory comprising at least one unicast buffer and a multicast buffer, the packet handler storing each data unit packet in a corresponding one of the at least one unicast buffer and the multicast buffer according to the data unit header appended thereto; and

a plurality of modulators adapted to request a buffered packet, modulate and transmit the requested packet therefrom, the packet handler retrieving a given data unit packet from one of the at least one unicast buffer and the multicast buffer in response to a request for a data packet, at least a payload portion of the retrieved data unit packet being stored in an output buffer associated with each of the plurality of modulators from which the packet is to be transmitted according to the information in the data unit header of the retrieved data unit packet.

60.   (Previously Presented) The multimodulator of claim 59, further comprising a packet requester that sends the request for a data packet for given one of the plurality of modulators that is determined to be ready to receive a data packet, the packet requestor placing at least the payload portion of the retrieved data unit packet in the output buffer indicated in the data unit header thereof.

61. (Previously Presented) The multimodulator of claim 60, wherein, if the retrieved data unit packet is a multicast packet, the packet requestor copies at least the payload portion of the retrieved data packet and stores each copy of the data packet to a respective one of the output buffers indicated in the data unit header.

62. (Previously Presented) The multimodulator of claim 60, wherein the packet requestor strips the data unit header from the data unit packet before the retrieved packet is stored in each output buffer for transmission.

63. (Previously Presented) The multimodulator of claim 59, wherein the packet handler determines whether a payload portion of the retrieved data unit packet should be encrypted prior to transmission from the multimodulator.

64. (Previously Presented) The multimodulator of claim 63, further comprising an encryptor that encrypts the payload portion of data unit packet, the encrypted data packet being sent to the output buffer indicated by the data unit header thereof.

65. (Currently Amended) The multimodulator of claim 59, further comprising a request counter that is adapted to keep count of packet requests from the packet requestor for each of the modulators, and the ~~packet~~ request counter increasing a packet request count for a particular modulator when a packet is requested for the particular modulator and decreasing the packet request count for the particular modulator when a packet is sent to the output buffer particular modulator.

66. (Currently Amended) The multimodulator of ~~claim 59~~ claim 65, wherein the at least one unicast buffer comprises a plurality of unicast buffers, each unicast buffer being associated with a respective one of the plurality of modulators and being a first-in-first-out buffer, and when a given packet is retrieved from the unicast buffer associated with the particular modulator the given packet is the current first-in packet, and wherein when a given packet is retrieved from the

multicast buffer the given packet is determined at least in part by the current status of the ~~packet~~ request counter and at least in part by the modulator identifier associated with the given packet.

67.   (Previously Presented) The multimodulator of claim 59, wherein at least one modulator of the plurality of modulators is a radio frequency modulator.

68.   (Previously Presented) The multimodulator of claim 67, wherein the radio frequency modulator is a quadrature amplitude modulation modulator.

69.   (Previously Presented) The multimodulator of claim 59, wherein the packets of the at least one transport stream include packets conforming to MPEG protocols, and, depending upon a management field of the data unit header, the given packet has a first PID when it is received and a second PID when it is transmitted, wherein the second PID is different from the first PID, wherein the management field includes information regarding PID remapping specifying the first PID to the second PID.

70.   (Previously Presented) The multimodulator of claim 59, further comprising:
a second input port in communication with the processor and the plurality of modulators, the second input port adapted to receive a second transport stream at a second input port, the second transport stream including a plurality of packets; and
wherein the each packet that is to be transmitted from at least one modulator of the plurality of modulators is extracted from the transport stream and sorted into a plurality of groups of extracted packets, the plurality of groups including a multicast group that includes multicast packets from the first and second transport streams and at least one unicast group that includes unicast packets from the first and second transport streams.

71.   (Previously Presented) The multimodulator of claim 70, wherein the at least one unicast group is a plurality of unicast groups, each unicast group being associated with a given modulator of the plurality of modulators.

72.   (Previously Presented) The multimodulator of claim 71, wherein the first and second transport streams include packets that conform to MPEG protocols.

73.   (Previously Presented) The multimodulator of claim 72, wherein at least one packet of the first transport stream has a first PID value associated therewith and at least one packet of the second transport stream has a second PID value associated therewith, and wherein the first PID value and the second PID value are the same value.

74.   (Previously Presented) The multimodulator of claim 71, wherein when a packet conforming to MPEG protocols is received the packet has a first PID value associated therewith, and the packet has a second PID value associated therewith when the packet is transmitted as a multicast packet.